Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (original): A tunnel diode in which the collector comprises a band gap material, said band gap material being a crystal material having filled zero temperature valence band and empty conductive band.

Claim 2 (original): The tunnel diode of claim 1 additionally comprising an emitter coated with a layer of a band gap material.

Claim 3 (currently amended): The tunnel diode of claim 1 ~~or claim 2~~ in which the collector comprises a layer of band gap material deposited on a metal collector.

Claim 4 (original): The tunnel diode of claim 3 in which said layer of material has a thickness greater than the mean distance of relaxation of electrons tunneling from said emitter.

Claim 5 (currently amended): The tunnel diode of ~~any of the preceding~~ claim[[s]] 1 in which the band gap material is selected from the group consisting of: a semiconductor, a hetero-structured semiconductor, a dielectric, a diamond material, an alkali metal oxide and an alkaline earth oxide.

Claim 6 (currently amended): The tunnel diode of~~any of the preceding~~ claim[[s]] 1 in which the band gap material is selected from the group consisting of: Ge, Si, GaAs, SiC and AlGaAs.

Claim 7 (currently amended): The tunnel diode of ~~any of the preceding~~ claim[[s]] 1 in which the electrodes are separated by a gap in the range 1 – 100nm.

Claim 8 (currently amended): The tunnel diode of claim[[s]] 1 ~~to 6~~ in which the electrodes are separated by a gap in the range 1 – 10nm.

Claim 9 (currently amended): The tunnel diode of claim[[s]] 1 ~~to 6~~ in which a gap between the emitter and collector electrodes is evacuated.

Claim 10 (currently amended): A vacuum diode heat pump comprising the tunnel diode of ~~any of the preceding~~ claim[[s]] 1.

Claim 11 (currently amended): A heat to electricity converter comprising the tunnel diode of claim[[s]] 1~~ to 9~~.

Claim 12 (original): A method for promoting the tunneling of electrons having an energy level higher than the Fermi level from an emitter surface, comprising the step of positioning a collector comprising a band gap material at a distance within the tunneling range of said electrons, said band gap material being a crystal material having filled zero temperature valence band and empty conductive band.

Claim 13 (original): A method for preventing back tunneling of electrons in a tunnel diode comprising the step of coating a collector with a layer of a band gap material, said band gap material being a crystal material having filled zero temperature valence band and empty conductive band.

Claim 14 (currently amended): The method of claim[[s]] 12~~ and 13~~ in which the collector comprises a layer of band gap material deposited on a metal collector.

Claim 15 (currently amended): The method of claim 14 in which said layer of material has a thickness greater than the mean distance of relaxation of electrons tunneling from said emitter.

Claim 16 (currently amended): The method of claim[[s]] 12~~ to 15~~ in which the band gap material is selected from the group consisting of: a semiconductor, a hetero-structured semiconductor, a dielectric, a diamond material, an alkali metal oxide and an alkaline earth oxide.

Claim 17 (currently amended): The method of claim[[s]] 12~~ to 15~~ in which the band gap material is selected from the group consisting of: Ge, Si, GaAs, SiC and AlGaAs.

Claim 18 (currently amended): The method of claim[[s]] 12~~ to 17~~ in which the electrodes are separated by a gap in the range 1 – 100nm.

Claim 19 (currently amended): The method of claim[[s]] 12~~ to 15~~ in which the electrodes are separated by a gap in the range 1 – 10nm.

Claim 20 (currently amended): The method of claim[[s]] 12~~ to 15~~ in which a gap between the emitter and collector electrodes is evacuated.